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ABSTRACT

This paper examines how Ciulistet, a group of Yup'ik Eskimo elders, teachers, aides, and university collaborators, has slowly begun transforming education in southwest Alaska. Specifically, this paper shows how this indigenous group has produced, interpreted, and applied ancient Yup'ik wisdom to the modern context of schooling. Formally established in 1987, Ciulistet meets three or four times a year for a week or weekend. An example describes how elders have led discussions of Yup'ik numeration, exercises in grouping and place value, and explorations of connections to other mathematical and scientific concepts of time and place. Based on the body, the Yup'ik base-20 and subbase-5 system offers at least four concrete and conceptually different ways of teaching numeration and lead to considerations of the mathematics embedded in the Yup'ik linguistic system and of cultural differences in number patterns, grouping, and addition. As in the number system, Yup'ik ways of measuring also involve the body. Ciulistet meetings provide support to teachers attempting to develop, refine, and implement Yup'ik mathematics in the elementary curriculum of their schools. Implications for teacher education are discussed, particularly in minority and ethnic linguistic communities concerned with representing themselves in the processes and products of schooling. (Contains 32 references.) (SV)

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TRANSFORMING THE CULTURE OF SCHOOLING

TEACHER EDUCATION IN SOUTHWEST ALASKA

Submitted By: Jerry Lipka and
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Transforming the Culture of Schooling: Teacher Education in Southwest Alaska

Background

We, the certified Yup'ik teachers, sit in awe as our elders unfold the knowledge from their memory. There are no reference notes or books in front of them. They cite their elders and often in embarrassment they apologize for not remembering the information fully. They wish that one of their elders was amongst them to help guide and to complete their knowledge and stories. But there are other elders who help the presenter. We observe no criticism, only a lot of laughter and amusement, as they compare notes from their memory. We observe much respect for the presenter, the elder, who is sharing and unfolding the knowledge held within. We observe patience and respect for the information being presented. We realize that all individuals present information according to their understanding, and this is respected. We sit and digest and also laugh because we are embarrassed that we understand so little of the ancient language. We often have to interrupt our elders' train of thought and ask them to help us understand. Often this is very difficult, but either we come to understand or it is held for later reference. We document by using videotapes, tape recorders, lap-top computers, and handwritten notes. We do not have the trained memory of our elders.

We return to our villages excited and eager to share all this "new" knowledge after we had discussed ways of implementing it in the regular classroom and school curriculum. We had confirmed with the elders that the information was accurate, and the elders consented to our method of presentation to the students in the schools. But as we enter our schools, we remember that we are required to teach the OBE (Outcome Based Education) or other objectives that have been so cleverly developed by our non-Native administrators and approved with much enthusiasm by our school board members. We remember that our students will be tested. We

need to show the non-Native administrative staff and our school board members that we have been teaching, that we've worked diligently to ingrain those 'skills" into our students. There is but little time and place to implement these "new" ideas into our community schools. However, there are certified Yup'ik teachers who have taken the extra steps and are precariously implementing this "new" knowledge into the school curriculum. Their persistence, innovativeness, and courage has allowed them to begin this transition. As there are no existing materials for purchase from large publishers, we must develop our own materials and pedagogy to effectively translate the elders' ancient knowledge to fit into modern-day schools. This is our work.

This chapter is written by Esther Illutsik, an educator (who is a Yup'ik), and Jerry Lipka, an educational researcher (who is not Yup'ik). It presents one way in which a teacher group, Ciulistet (Leaders), composed of Yup'ik elders, teachers, aides, and university collaborators has slowly begun transforming schooling. More specifically, this chapter will show how this indigenous group has produced, interpreted, and applied ancient Yup'ik wisdom to the modern context of schooling. Because our group is fundamentally a community-based collaborative partnership, the curriculum is jointly constructed and the pedagogy is developed from Yup'ik and Western approaches to teaching. Although our work in teacher education and educational reform pertains to a specific cultural group, we still believe that it addresses issues of diversity and educational reform. For example, our methods include a three-generation model (elders, teachers, and students), insiders and outsiders (local Yup'ik members and partners from the university community), and a research agenda that develops from the interests of the group. This chapter highlights examples of this partnership in knowledge production, particularly in applying Yup'ik knowledge to school and the teaching of school mathematics. Because the Ciulistet is a culturally specific group, "culturally relevant" curriculum and pedagogy take on additional meaning. It includes Yup'ik ways of knowing, Yup'ik knowledge, and extending that knowledge into a modern context. We conclude with implications for teacher education, particularly in

minority and ethnic linguistic communities that are concerned with representing themselves in the processes and products of schooling. However, the limitations of space require us to present only a small portion from a much larger body of material on our work (for more details see Ilutsik, 1994; Lipka, in press).

Brief Literature Review and Theoretical Perspective

The literature on American Indian Alaska Eskimo schooling is amazingly consistent from the turn of the century to the present (Meriam, Brown, Cloud, & Dale, 1928; U. S. Department of Education, 1991; U. S. Senate Select Committee, 1969). This research stresses the importance of involving the community by increasing their participation in schooling, using the wisdom of elders, and using the local culture, language, and everyday experience as an integral part of schooling. Presently, in southwest Alaska, school children continue to score between the 20th and 40th percentile on the Iowa Test of Basic Skills, and their lowest scores are in the area of problem solving (Lower Kuskokwim School District, draft document, 1995).

Although education represents the best hope to ameliorate this situation, high teacher turnover rates in Alaska's predominantly rural Native communities frustrate efforts at teacher enhancement. Only 3% of Alaska Native high-school graduates completed a four-year degree, compared to 21% for the non-Native population of the state (U. S. Bureau of the Census, 1992). While in college, for example at the University of Alaska Fairbanks, Alaska Native students have the lowest percentage of graduates compared to all other groups. Not surprisingly, only 2% to 4% of the state's teachers are Alaska Native, even in communities where 95% of the population is Alaska Native.

Similar demographic data has been analyzed by others concerned with increasing the number and quality of minority teachers. Two competing paradigms guide teacher education that is concerned with addressing the disproportionately low number of minority and indigenous

teachers. One paradigm, firmly established during the Johnson years, established such teacher preparation programs as the *Teacher Corps*, the premise being that teacher education programs had to be made more accessible to Blacks, Hispanics, and American Indians/Alaska Natives. The second paradigm, increasingly in vogue today, suggests that since there are not enough minority teachers for schools with large minority populations, then we must prepare "white" teachers, and sensitize them to the conditions of the "other." (See Zeichner, 1992; Banks, 1991).

Although we agree that sensitizing majority teachers for culturally different contexts is a necessary condition of the present, how these teachers-to-be become sensitized, who sensitizes them, and under what conditions makes a significant difference. Disturbingly, it appears that instead of making educational institutions more accessible to minority and indigenous teachers-in-preparation, the scarce resources for teacher education are being used to "sensitize--mainstream and an elite class of students. For example, some prominent educators and educational institutions are opting for "field experiences" and courses that facilitate the kind of personal and professional transformations that many white, monolingual student teachers must undergo to become successful teachers in cross-cultural situations (Zeichner, 1992).

Unfortunately, under this paradigm of accepting the present reality, there is little hope to transform the fact that there are not enough minority teachers to teach minority children. We find the logic of this approach quite disturbing. There is no argument with the statistical fact that for the near future, there will not be enough minority and Native American teachers to meet the demand to teach in ethnic minority and indigenous contexts. We also know that the minority population in most inner cities and in several states has approached or surpassed 50% of the population. However, using these *facts* to further reinforce the present status quo, that is, providing programs and experiences for "white" teachers so that they may be sensitized to work cross culturally, is cultural hegemony. Such an approach, at best, can produce "successful" majority teachers who work with minority students and community and reinforce the present status quo. We believe that this approach is woefully inadequate and has no promise for

transforming the present set of economic, historical, political, and social realities that make access to and success in the teacher profession difficult for minorities.

Instead, we believe that the indigenous teacher education groups and culturally specific approaches to teacher education and schooling (Foster, 1995; Ladson-Billings, 1995; Lipka, in press; Lipka & Ilutsk, in press; Lipka & McCarty, 1994) offer an alternative to the apologist position of sensitizing without increasing the number of minority and indigenous teachers. We suggest that a cadre of indigenous and minority teachers who work within a zone of safety not only produce role models but can begin a process of transforming the knowledge base in which curricular and pedagogical decisions are made. Basing curricular and pedagogical decisions on, for example, Yup'ik knowledge, ways of knowing, and ways of interacting creates new curricular and pedagogical possibilities. Because of indigenous teacher groups becoming active brokers between school and community, the potential exists to transform a set of historical and political relationships between indigenous and mainstream communities.

We argue from evidence collected over a decade that the contribution of indigenous teacher groups can provide important tools for determining the what, how, and why of schooling. Otherwise, we fear that the powerful forces of assimilation—language and cultural loss and community alienation from schooling—will continue unabated. Schooling is conceived of in a historical context evolving from colonial times. Far too often the present-day result of this legacy is an alien institution in which indigenous teachers are asked to leave their culture and language at the schoolhouse door (see a special issue on this topic Watson-Gegeo, 1994). Yet teachers' groups such as Ciulistet form an important link between the culture of the school and that of their community. Monocultural conceptions of good and effective teaching exist as if they were applicable everywhere and for all times. Teacher groups such as Ciulistet create a promise for altering our conception of teaching and schooling and the relationship between school and community. Rather than accept business as usual—too often leading to assimilative teaching practices with predictable consequences of language and cultural

loss—these groups raise the possibility of transforming the status quo.

Methods

Our work is based on trust developed from a long-term collaborative relationship between Yup'ik teachers, Yupik elders, and university faculty and consultants. This community-based effort was initially supported and championed by a superintendent of schools, making the partnership between school, community, and university a reality. Our formal research work began by investigating the wisdom of practice of Yup'ik teachers. By identifying, in a group setting, those ways of communicating and organizing classroom and personal space and the values that underlined those behaviors, we were able to challenge notions of "good teaching" (see Ladson-Billings, 1995; Lipka, 1990a, 1990b, 1991; Malin, 1994). However, we found that in a Yup'ik context, the wisdom of practice needed to be explored beyond the parameters of the classroom and needed to include the wisdom of the elders. Heretofore, the knowledge base of the elders, ways of knowing and conceptualizing, and even the use of the Yup'ik language to carry formal discourse related to schooling were far too often ignored. Since 1992, elders have become a vital part of the Ciulistet group. By changing the reference group from mainstream educators and their notions of "good" and "effective" teachers to Yup'ik teachers and elders, we have been able to more clearly see the relationship between indigenous culture, schooling, and power.

Indigenous Teacher Groups: Ciulistet

The advent of indigenous teacher groups further defines the concept of "culturally appropriate" pedagogical approaches to include new curricular possibilities. These possibilities are emerging from increased numbers of indigenous teachers, the formation of indigenous teacher groups, and the inclusion of elders and community members. The willingness of these members to take risks and begin evolving a pedagogy and curriculum that bases itself on indigenous culture, language, and values runs counter to over 100 years of federal Indian policy and many present-day policies and practices (Ilutsik, 1994; Lipka, 1994; Lipka & McCarty, 1994). Although these groups are predominantly indigenous, "outside teachers" are members and under the tutelage of elders. In

collaboration with Yup'ik teachers, "outside teachers" are not only being sensitized but they are also making contributions as they interpret elders' knowledge and apply it in a classroom setting. Because our group invites elders and community members, it has allowed elders to reveal knowledge long suppressed due to the influence of Christianity and the school dismissing indigenous language and culture. The formation of the Ciulistet, of course, depended on these teachers first being able to become teachers.

Gaining Access to Teacher Education: X-CED

Yup'ik teachers have gained more access to higher education in Alaska through a Teacher Corp program run through the University of Alaska Fairbanks. This program, the Cross-Cultural Educational Development Program (X-CED), was established in 1970 and has the goal of increasing the number of Alaska Native teachers. This program, often under close scrutiny, continues to be the leading program in graduating Alaska Native teachers.¹

X-CED is a field-based program operating in many of Alaska's regions and villages. The program was designed to take advantage of the contextual circumstances surrounding schooling in rural Alaska and to offer students an opportunity to learn and earn a bachelor's degree in education while living at home. Most interior and western Alaska villages are located off the road system, and access to higher education is often through this field-based program with its audio-conference network. Offering courses and the teacher education program to the villages is particularly important, since often obtaining a college education is only feasible through these delivery methods. In addition, since many of the students in this program are and have been community leaders or are otherwise bound to their community, having a locally accessible program is the only way many of these students can gain access to the university. Because of this program, during the past two decades, the X-CED program has increased the number of Alaska Native teachers in the state from less than 10 to over 200 (personal communication Ray Barnhardt, 1995).

Illutsik started working in this program in 1979 and was joined by Lipka in 1981.

Although we do not work for X-CED today, we continue to work directly with many of the graduates who are members of the Ciulistet group.

The Ciulistet: Knowledge Production, Interpretation, and Application

The Ciulistet, formally established in 1987, meets three or four times a year, typically for weekend meetings and a week-long end-of-the-year meeting. During these meetings, discussions are held in the Yup'ik language with only periodic translations for the non-Yup'ik partners and guests. We began these teacher group meetings with an intuition that Yup'ik teachers were different than non-Yup'ik teachers. However, most of us at that time were unclear exactly what those differences were. Studies during this phase of our work concentrated on sociolinguistic differences between Yup'ik and non-Yup'ik teachers and ethnographies of Yup'ik teachers (see Ilutsik, 1994; Lipka, 1990a, 1991; Lipka & Ilutsik, in press; Sharp, 1994). Moreover, as a group we realized that the concept of cultural differences was insufficient because it did not capture the essence of the existing rich Yup'ik knowledge base.

Three-generation model: community-based and collaborative.

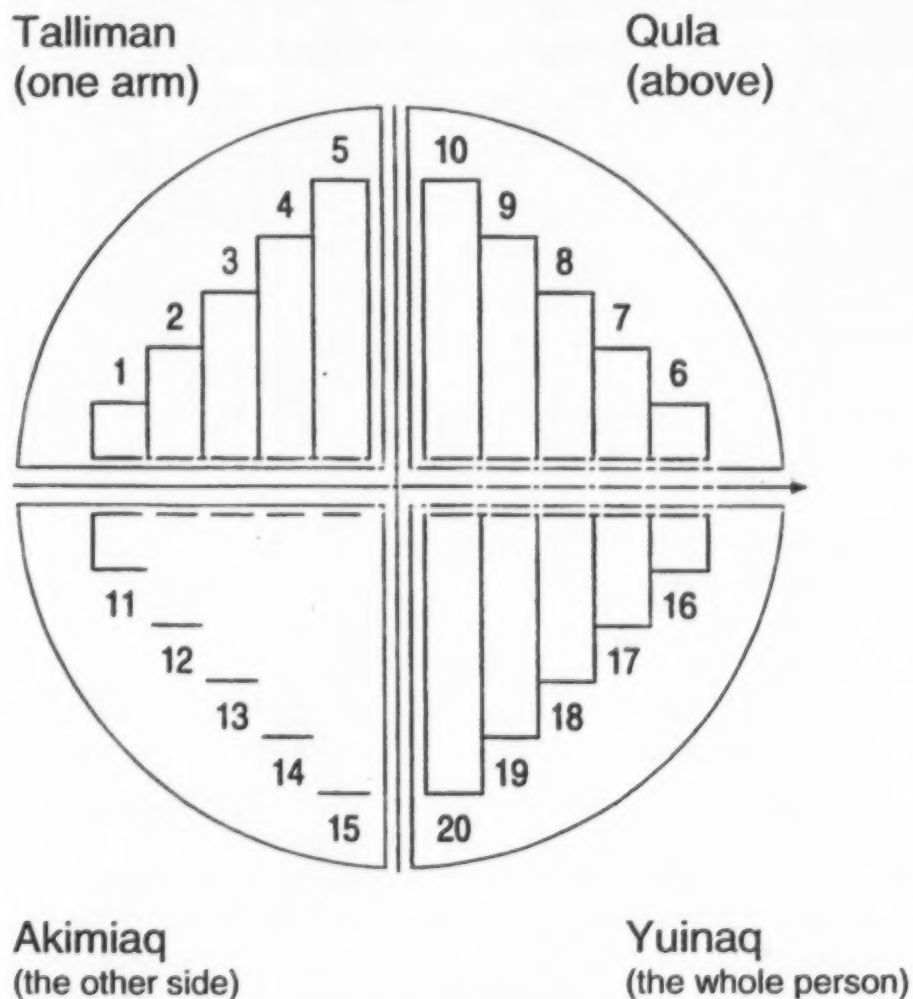
To deepen our understanding of the Yup'ik knowledge base, we invited elders to our meetings. The inclusion of the elders immediately altered the nature of the work. We moved from proving the worth of Yup'ik teachers (Lipka, 1990b, 1991) to a more thorough understanding of Yup'ik knowledge and values. To accomplish this shift, we built on the existing kin-like structure of our meetings, since many of the invited elders were related to the teachers. Trust was already established by the close working relationship between some of the non-Yup'ik members of the group and teachers and elders. Therefore, the elders were willing teachers. In addition to the community-based and kin-like working relationships, the teacher group also included children of the teachers, making this a three-generation group. The meetings became a form of cultural transmission. This transmission was a not simple one of passing down information, but a complex one of interpreting and translating this knowledge into a modern context: schooling.

Yup'ik Counts: Ethnomathematics and its Implications for Schooling

Elders were not called on to "reveal" their knowledge or "tell" their stories, but to be partners in the process of knowledge translation and application. For example, one of the first areas we collaborated on was Yup'ik numeration. We explored the topic, first by having the elders count, later through exercises in grouping and place values, and more recently by connecting numeration to other mathematical and scientific concepts of time and place. These explorations have become a rather large and ongoing inquiry. Yup'ik, like many other cultural groups, formed their number system by using body parts. They used hand and foot counters—all the fingers on one hand, then the other, all the toes on one foot, and then the other. Because this way of counting still contains its connections to the human body, it allows teachers and the researchers to understand more fully how numbers are derived in general. It opens up natural inquiries into how numbers evolve over time and from one culture to another. It suggests and makes clear the social construction of numbers, and mathematics in general. It provides opportunities for teachers and students to devise written numerals, since Yup'ik was an oral language. Simultaneously, it makes for cross-cultural comparisons between numeration systems, making anomalies in the English language more apparent as to why we don't say "one teen" and "two teen." In fact, AngloSaxons had some difficulty ordering their numbers past ten. (See Funk, 1950, p. 325, for a careful explanation of the derivation of the modern terms eleven and twelve). For example, the Yup'ik number words are representations of fingers and toes, with the base being represented by a whole person, *Yuk*, equaling 20. Therefore, Yup'ik is a base 20 system. Most of the number words have other meanings: for example five, *talliman*, means "one arm." Yet, the literal meaning for 10 is not "two arms" but "above," *qula*. The ancient word for 11, not used any more in modern Yup'ik, is "it goes down," *atraqtuq*. The Yup'ik word for six means one on the other side," referring to one finger on the other hand. As we studied the Yup'ik numeration system it became clearer to some of us that there were patterns embedded within the system. One pattern was a top/down and left/right axis, following the way numbers

are represented: half the body was represented by above while the other half was represented by below. This indicates that the body could also be used for orienting and navigating, since a top/down and left/right axis form part of the necessary ingredients required for locating one's self. See figure 1 for a graphic representation of Yup'ik numeration through 20.

Figure 1: Yup'ik Numeration



Implications for Teaching: Numeration

This is an opening into a multitude of concepts, constructions of reality, and connections across disciplines in ways that would seem quite novel to elementary teachers of mathematics.

As the figure 1 indicates, the Yup'ik base 20 and sub-base 5 system offers at least four concrete and conceptually different ways of teaching numeration. First, teachers and students can work together to understand how numerical systems are constructed. Historically there have been many base 20 cultures: The Aztecs and Mayas used a base 20 system. In French, eighty is *quatrevingt*, or "four 20s." "Score" was common usage in English, as in "Four score and seven years ago." (Zaslavsky, 1973, p. 36). Mathematics can then be viewed as a socially constructed and evolving conception, based originally on physical phenomena.

Second, teachers can develop teaching tools that address a base 20 system. For example, the Ciulistet and the authors have under construction a Yup'ik Math Tool Kit, which is specifically designed to take advantage of the mathematics embedded in the linguistic system. More concretely, by using place values based on base 20, teachers and students can take advantage of the linguistically and culturally ordered way of organizing numbers. We are presently constructing base 20 blocks to further connect Yup'ik language and culture to concrete tools which meet National Council of Mathematics Teacher standards and simultaneously reinforce Yup'ik conceptions of reality.

Third, in many classrooms in Yup'ik communities, the bilingual program teaches numbers in Yup'ik but not Yup'ik numbers. For example, 1 to 10 are simply translated into Yup'ik, inadvertently changing the base and losing the cultural meaning of the numeration system. Our present work can contribute to recognizing that the Yup'ik language contains its own way of organizing numbers.

Fourth, teachers can have more opportunities to show students that different cultures create different number patterns and different ways of grouping (hence addition),

and all of this presents more possibilities for teaching mathematics while reinforcing the local culture.

Our work has additional implications for teachers and teacher groups. Although our group is not producing the knowledge behind the development of the Yup'ik Math Tools, we are producing knowledge through our interpretations, translations, and extensions of ancient knowledge to modern schooling. We take precautions that our interpretations and classroom adaptations do not "imput[e] mathematical categories to those practices that members of the culture may not claim" (Dowling, 1991, p. 106). By working collaboratively with the elders, we have built in some checks against this type of error. Elders participate with teachers, researchers, and students in testing and validating the curricular innovations of the Ciulistet (for a fuller discussion of this process and other innovative approaches see Lipka, in press). This approach to teacher education places inquiry and research as a fundamental component of teacher development, and this is done within a framework that shifts the reference group and knowledge base to the local culture.

Implications for Teaching: Measurement

Although conceptions of measurement and numeration are typically treated as separated topics, our work with the elders has shown us that they are related in fundamental ways. Because the numeration system derives from the body, the body is associated with numbers. Yup'ik ways of measuring also involve the body. The Yup'ik culture, like many others, has a system of informal body measures. For example, the outstretched arms from fingertip to fingertip is *yagneq*. Other body measures represent different lengths, and body proportions are often used in estimating and making clothes. For teachers of elementary school math in Yup'ik communities, the use of informal body measures becomes an excellent way to teach that reflects local usage, relies on visualizing, and provides students with a sense of space. The human body in both numeration

and measurement becomes a starting place. Interestingly, by using a hand measure (the width of one hand), number of hands to one's elbow is approximately five. Since the hand-to-elbow measure is equal to one fourth of the length of the body, then approximately 20 hand widths equals the length of the body. This brings the concept of body proportionality (20 hand measures to the length of the body) and Yup'ik measures and base 20 together (see Lipka, 1994 for further discussion). Here mathematics can be understood in its concrete form, and from this teachers can show how mathematics makes increasingly more abstract representations. By using the local culture, some very obvious teaching opportunities emerge. Besides moving from the concrete and "hands-on" to the abstract and "minds-on," this approach welcomes integrated teaching. In figure 2 below, Henry Alakayak (one of the elders associated with the project) demonstrates the use of a hand measure in setting up a snare. The hand measure is but a small part of a larger knowledge base concerning specific animals, their habitat and habits, and local ecology. By combining the knowledge from these elements, the trapper knows where, when, and how to set a trap. The possibilities for teaching across the curriculum in a holistic manner are many. In fact, we have presented such ideas at statewide conferences.

Classroom Implications

The topic of informal measures and hand measures was introduced to the Ciulistet on a number of occasions. Although the certified Yup'ik teachers as a group have not yet extended this knowledge into school-based activities, we found this information quite useful.

For example, in a village classroom Ilutsik and the Yup'ik teacher, Virginia Andrew, worked together to incorporate this information into our lessons. Every week we had an elders day, where elders from the village would come and share their knowledge. It so happened that we had been studying local animals and the traditional means of capturing them. We asked a male elder to demonstrate snare setting. He showed the students that different settings for the

snare were required depending upon the height of the animal. Without thought or explanation, he used different hand measurements for the different heights. If we had not been introduced to these different kinds of hand measurements at a prior meeting of the Ciulistet research group, we would have missed it. Since we had knowledge, we asked the elder to explain his actions. We also had the children practice these different measurements, as if the children would be setting their own snares.

Limitations and Obstacles

Although most of the Yupik teachers in the group and in the classrooms in this school district are Yup'ik speakers and tools being derived by the group are formed from cultural and linguistic constructions, this does not mean that the teachers can automatically use these tools and approaches in the classroom. As indicated earlier, schools have been and continue to some extent to reflect "outside" construction of "good and effective" teaching. Although the schools exist within Yup'ik communities, the communities have not formed the culture of the school. Further, schooling is a fairly recent phenomena in many of the regions communities and has reflected rather traditional and basic education. Most of the Yup'ik teachers have experienced this form, and the English language was the medium in which they learned. Being schooled one way and attempting to change that is a struggle (see Ilutsik, 1994; Sharp, 1994). Since no role models exist and there are no textbooks to rely on, support must come internally and through the group and the community. Changing classroom behaviors then places teachers in a position of being even more different from their "outside" colleagues. These are risky positions because no community is a monolith, even in its support of local teachers. In fact, there is some ambivalence (see Lipka, 1994; Sharp, 1994). Under these conditions change is slow.

Yet elders, teachers, and aides continue to meet. Ancient pedagogical forms such as *sugat* [dolls] and Yup'ik dancing are increasingly being adopted and adapted to schooling. Our meetings become far more than a zone of safety; they become a place in which elders' sharing becomes the foundation upon which pedagogical forms are developed to teach Yup'ik

conceptions. From meeting to meeting, pedagogical methods are devised, refined, and slowly tried in the classroom. At the present time, we are working with the newly funded National Science Foundation Rural Systemic Initiative in Alaska. One aspect of this initiative is to form indigenous teacher groups and to use the work of the Ciulistet to help others in using their culture as a basis for curriculum and pedagogical work in mathematics and science education.

Implications for Minority Teachers and Teacher Educators

It is too soon to know with any certainty the effects that indigenous teacher groups can have on novice and minority teachers. However, from our experience and others (Ilutsik, 1994; Lipka, in press; Lipka & McCarty, 1994) it seems that indigenous teacher groups allow for an exploration in teaching that would be practically impossible in a more heterogeneous group dominated by a mainstream approach to teaching. Our experiences as classroom teachers and researchers in the late 1980s showed us that Yup'ik teachers were often under the scrutiny of local principals and even some community members for teaching "differently" from others, and some were pressured to teach in English and not in Yup'ik. The Ciulistet group allowed a space in which the teachers could freely express themselves and more fully understand their circumstances. Instead of feeling isolated, the teachers began to gain a sense of solidarity and understanding of their circumstances. This led to the continuing exploration of Yup'ik mathematics and its potential as a viable part of the elementary school curriculum. In other indigenous communities where teacher groups exist, similar findings have been reported (see Annahatak, 1994; LaFrance, 1994; Lipka & McCarty 1994; Stairs, 1988). In each of these reports and studies, the coming together of indigenous teachers has brought more possibilities for using traditional knowledge and pedagogy in schooling.

In the African-American community, the importance of teacher groups has been reported by Foster (1995), Ladson-Billings (1995), and Nelson-Barber (1991). Here the emphasis has been more on communicative styles and underlying values associated with ways of interacting. In both cases, instead of experiencing their ways of organizing space, interacting, and managing

classrooms as a deficit, these teachers and teacher groups can now see how their ways relate directly to the culture and norms of the local community. Studies of both African-American teachers and indigenous teachers' sense of effective and good teaching provides alternatives to overly generalized conceptions of good teaching. These more culturally specific studies of "good teaching" (see Ladson-Billings, 1995) provide new teachers with a greater repertoire of teaching and begin to provide additional role models for novice minority teachers. Instead of preparing teachers for some generalized normative conception of good teaching, culturally specific teaching groups can be much more reaffirming for the novice teacher. In our work, this is occurring not only in terms of the ways of teaching but also in the possible content. Mathematics, science, and literacy derived from a Yup'ik cultural base open up numerous possibilities for both novice and experienced teachers.

Conclusion

It is clear that despite over a hundred years of research on Native American schooling and the steady call for the wisdom of the elders, the involvement of the community, and increasing the number of indigenous teachers, this has not been accomplished. We believe that through programs such as X-CED, we can increase the number of indigenous teachers. But without the access and with decreasing numbers of some minorities in today's schools, then such possibilities become ever more difficult to create.

Indigenous and minority teacher groups are not a panacea. Problems exist on a systemic and societal level as well as within individual classrooms and schools. However, indigenous and minority teacher groups, because of their membership in local communities and schools, can become important brokers. Because these teacher groups have a community and school function, change emanating from such groups addresses multiple levels—classroom, school, and community. Here the possibility exists for re-creating schooling in ways that are more inclusive.

Single-culture teacher groups such as Ciulistet can represent the focus, the norms, and

the language of discourse of this culture. Such an atmosphere has allowed for "outsiders" to be members, learning from elders. We believe that this has created a more healthy environment and a less prejudicial one. Here expertise and teaching roles switch, depending upon who has the expertise needed at the time. Under these circumstances we all work together. There is respect for Yupik and Western knowledge. The elders' curiosity often leads to discussions on topics discussed in graduate seminars. We have all learned and continue to grapple with ways of improving schooling. For the foreseeable future, teacher and elder groups appear to be one viable way to address schooling.

Culturally specific teacher groups have both theoretical and practical implications for teacher education. Theoretically, our work suggests that standards and competence that exclude local knowledge and ways of teaching inadequately represent indigenous teachers. More positively, culturally specific teacher groups are in the position to conduct research, produce knowledge, and apply that knowledge to schooling. This is theoretically important because as some researchers imply (Ogbu, 1995), indigenous and minority groups primary culture is now an "oppositional" culture to mainstream society. Our work contradicts this claim. It shows that within Yup'ik culture and language there are ways of knowing, organizing, and transmitting knowledge that are based on its own system and logic. The Yup'ik world view, still extant, is the primary cultural system, albeit radically changed from even the recent past. Further, our work implies that concepts such as "culturally relevant" teaching and curriculum are more than teaching and learning styles and ought to include local knowledge and ways of knowing as well. In terms of practice, by including both ways of teaching (communicating and interacting) and knowing, the teacher's range of possibilities is increased.

Through collaborative and community-based meetings, our research group has been involved in knowledge production and application. The examples outlined in this paper highlight some of the new possibilities in the teaching of mathematics. These possibilities are derived directly from the knowledge of elders. Furthermore, for one of the first times, at least within this

group, the possibility of combining Yup'ik ways of communicating and relating (pedagogy) with content derived from Yup'ik ways of knowing is a new reality. It is in these ways that the group is slowly in the process of transforming the culture of the school.

End Note

1. At the time of this writing, the X-CED program has been unilaterally renamed by the administration of the University of Alaska Fairbanks, the secondary field—based teacher education program has been “temporarily” been closed, and the future of field-based Native-oriented programs is uncertain. Change in administrative leadership seem to be the largest obstacle in the university continuing its leadership role and meeting its specific educational mission of increasing the number and quality of Alaska Native teachers.

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